Asthma Devices & Treatment

Delivery Systems

- Demonstrate indications and appropriate use of asthma devices
  - Metered dose inhalers (MDI)
  - DISKUS® and Turbuhaler® inhalers
  - Spacers (masked aerochamber)
  - Nebulizers

Choice of device

- Determined by -
  - Drug to be delivered
  - Age or more importantly, cognitive development of patient
  - Patient preference

Choice of device

- Does the medication come in the device of form the patient likes & can obtain?
- Does the device deliver a consistent/ reliable dose?
- Is it easy & quick to teach correct use?
- Is it easy to use correctly?
- What about patient preference?
- Is the device convenient for patients lifestyle?

Age-appropriate Aerosol Delivery

- Nebulizer
  - Infants & toddlers
- pMDI/ spacer w/ mask (children < than 4 years) or mouthpiece (children >4years)
  - No FDA approval for ICS by pMDI for children <6 years
- Dry powder inhalers
  - Children >5 years

Nebulizers

- Nebulizers are machines that transform liquid medication into a into fine mist form/ inhaled droplets that can be inhaled deep into the airways
- Both rescue and preventative medications are available in forms that can be nebulized

Nebulizers

- Nebulized Solutions
  - Albuterol (Proventil®)
  - Ipratropium (Atrovent®)
  - Budesonide (Pulmicort® Respules)
  - Albuterol/Ipratropium (Duoneb®)
- Inhaled medications delivered by an air compressor in the form of a fine spray

Nebulizers

- Components
  - Air compressor
  - Nebulizer cup
  - Mask or mouthpiece
  - Medication
    - Unit dose vials
    - Bottles with measurin devices
  - Compressor tubing

Nebulizers

- Advantages
  - Use of passive breathing
  - Good dosage form for a pediatric patient
  - Anything in solution can be nebulized
- Disadvantages
  - Time intensive
  - Inefficient and cumbersome
  - Equipment and power source required
  - Cleaning required

How To Use a Nebulizer

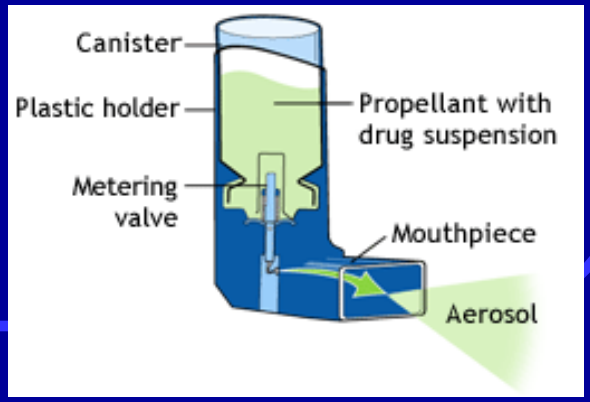
- Plug the cord from the compressor into a properly grounded electrical outlet
- Carefully measure medications (or pre-measured unit dose vials) exactly as instructed and put them into the nebulizer cup
- Assemble the nebulizer cup and mask or mouthpiece
- Connect the tubing to both the aerosol compressor and nebulizer cup

How To Use a Nebulizer

- Turn on the compressor and look for a light mist coming from the back of the tube opposite the mouthpiece
- Sit up straight and if using a mask, position it comfortably and securely on face. If you are using a mouthpiece, place it between teeth and seal lips around it
- Take slow, deep breaths. If possible, hold each breath for 2-3 seconds before breathing out
- Continue the treatment until the medication is gone (an average of 10 minutes)

Metered Dose Inhalers (MDI)

- Uses chemical propellants to deliver medication dose to lungs
  - Albuterol (Proventil®)
  - Ipratropium (Atrovent®) (Combivent®)
  - Fluticasone (Flovent®)
  - Beclomethasone (Beclovent®)
  - Pirbuterol (Maxair®)



MDI Inhalers

- Advantages
  - Deliver a reliable/ consistent dose of medications directly to the site of action
  - Onset of action is quicker than oral bronchodilators
  - Side effects are fewer with inhaled route
  - Most medications are available in this form
  - Portable

MDI Inhalers

- Disadvantages
  - Need good coordination of actuation and inhalation (technique important)
  - Not very efficient as delivery device – 20% or less of the dose that leaves the MDI is deposited in the lower airways – 80% remains in oropharynx
  - No built in counter/ uncertain when cartridge is empty

MDI Inhalers (CFC vs HFA)

- Chlorofluorocarbon-free (CFC-free) MDIs are being gradually introduced

How To Use a MDI

- Remove the cap and shake the inhaler
- Breathe out gently
- Seal lips around mouthpiece/ spacer
- Press down on the canister to release the medication as you start to breathe in deeply and slowly
- Hold breath for 10 seconds, or as long as possible, then breathe out slowly
- Wait a few seconds before repeating if you need to take a second puff
- Replace the cap

Autohaler

- Advantages
  - Easy to use because no coordination is required
  - Breath actuated, so uses a technique similar to that of dry powder inhalers

Autohaler

- Disadvantages
  - Requires a more rapid inspiration that the standard MDI
  - Activating lever may be too hard to use for certain people
  - No built in dose counter
  - Only pirbuterol is available in this device (not indicated for children)

Dry Powder Inhalers (DPIs)

- Rotahaler
- Diskhaler
- Diskus
- Turbuhaler

Rotahaler

- Advantages
  - Breath actuated
  - Can count doses missing from bottle
- Disadvantages
  - Loading dose requires considerable manual dexterity
  - Moisture sensitive

Diskhaler

- Advantages
  - Breath actuated
  - Four-blister pack should be enough for one day dosing
  - Disadvantages
    - Requires considerable manual dexterity
    - Only one drug available in this device (Fluticasone)

Diskus

- The DISKUS®
  - Salmeterol/Fluticasone (Advair®)

Diskus

- Advantages
  - Breath actuated
  - Has dose counter
  - Easy to teach & to use
- Disadvantages
  - Expensive
  - Can lose doses by playing with activation lever

How To Use a DISKUS® Inhaler

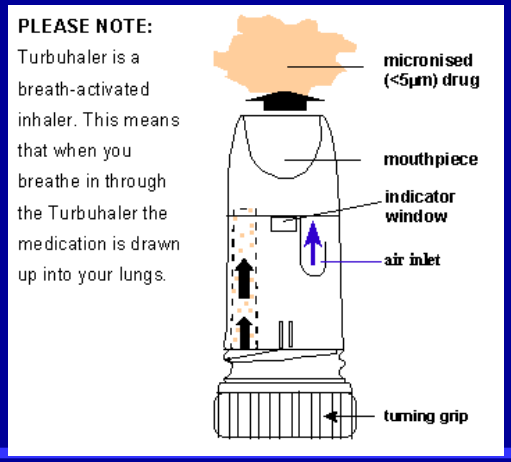
- Open the Diskus® by holding the outer casing in one hand while pushing the thumb grip away until a click is heard
- Hold the Diskus® level with the mouthpiece towards you, slide the lever away from you until a second click is heard
- Breathe out gently, seal lips around mouthpiece and breathe in steadily and deeply

How To Use a DISKUS® Inhaler

- Remove the Diskus® from the mouth and hold breath for ~ 10 seconds
- To close, slide the thumb grip back towards you as far as it will go until it clicks
- Repeat for a second dose
  - Do not breathe into the Diskus
  - Wash out mouth after administration
- The dose counter counts down from 60 to 0

Turbuhaler

- The Turbuhaler®
  - Budesonide (Pulmicort®)

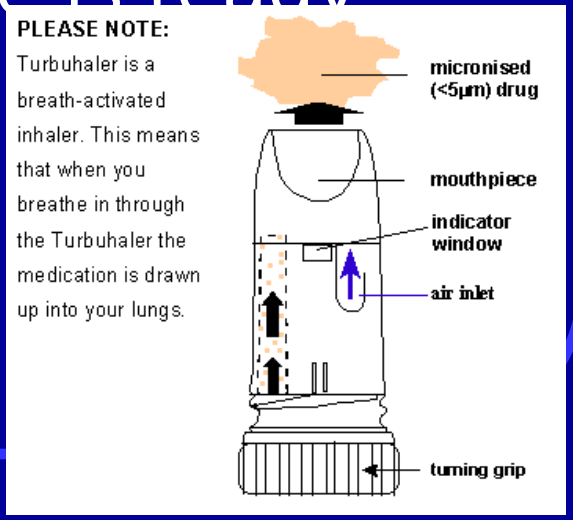

PLEASE NOTE:
Turbuhaler is a breath-activated inhaler. This means that when you breathe in through the Turbuhaler the medication is drawn up into your lungs.
micronised (<5µm) drug
mouthpiece
indicator window
air inlet
turning grip

Turbuhaler

- Advantages
  - Breath actuated
  - Indicator tells when 20 doses are left
  - Easy to teach & to use
  - No taste
  - Indicated for once-daily dosing
- Disadvantages
  - Only one medication available in this device
  - Can lose doses by playing with activation lever
  - Moisture sensitive

How To Use a Turbuhaler®

- Unscrew and lift off the white cover
- Hold Turbuhaler® upright and twist the grip to the right, then twist back again
  - Listen for a click, the dose is ready
  - Do not shake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How To Use a Turbuhaler®

- Breathe out gently, seal lips around mouthpiece and breath in as deeply as possible
- Remove the Turbuhaler® from the mouth and hold breath for ~ 10 seconds
  - Do not breathe out into the Turbuhaler®
- Replace white cover
  - A red line appears in the window on the side of the Turbuhaler® when there are 20 doses remaining

Pulmicort Turbuhaler®

MSRC is a proud sponsor of World Asthma Day

Step 1: OPEN

- Unscrew the cover and remove it.

Step 2: TWIST

- Hold the Turbuhaler® straight up and down.
- Twist the brown grip all the way to the right and back again all the way to the left until you hear it **click** – that means the medication is loaded.
- Turn your head away from the inhaler and breathe out all the way.

Step 3: INHALE

- Place the mouthpiece between your lips and tilt your head back a little.
- Breathe in as deeply and quickly as you can.
- Hold your breath for as long as you can (up to 10 seconds).

Finish: RINSE

- Rinse your mouth with water after using Turbuhaler®, but do not swallow.

If you need more than one dose: repeat steps 1–3.

More Tips:

- You will have gotten the dose of medication even if you do not feel or taste it.
- Store your inhaler at room temperature and away from moisture.
- Always keep your inhaler dry. Clean it with a dry tissue or cloth.
- Do not shake or turn your inhaler upside down after the dose has been loaded.
- Do not breathe into your inhaler.
- Your Turbuhaler® is empty when the red mark is at the bottom of the window.

About the Medication:

- Turbuhaler® contains an inhaled steroid Budesonide (bew-DES-o-nide) that helps to control the symptoms of asthma and helps you breathe better.
- This medication will not stop an asthma attack that has already started.
- A quick-acting bronchodilator (like albuterol) should be used to stop an asthma attack or asthma symptoms that need immediate attention.

DO NOT STOP TAKING THIS MEDICATION WITHOUT CONSULTING YOUR PHYSICIAN. Turbuhaler® contains an inhaled corticosteroid, which treats airway inflammation and may prevent long-term serious changes within your airways.

The mission of the MSRC is to provide education and training to Respiratory Therapists, health care professionals and their patients.

MSRC

To re-order visit: www.msrcnet.com

Using your Dry Powder Inhaler . . . It's as easy as 1-2-3!

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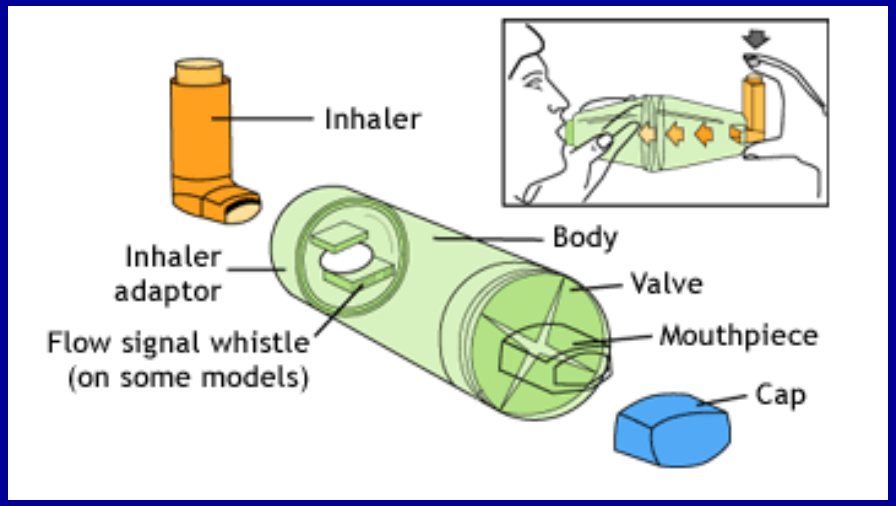
Spacers or holding chambers

- Purpose
  - Ensure medication is delivered to lungs
  - Decrease particle size for improved delivery
- Advantages
  - Less/No coordination required
  - May breathe in and out several times to receive complete dose
  - Easier to use an inhaler with a spacer for a pediatric patient
  - Faster delivery than nebulizer and less expensive
- Disadvantages
  - More cumbersome than MDI alone
  - Cleaning required
  - Expensive

Spacers

- Aerochamber®
  - Small, Regular, Large, Plus
- Azmacort®
  - Built-in spacer with device



How To Use an Aerochamber®

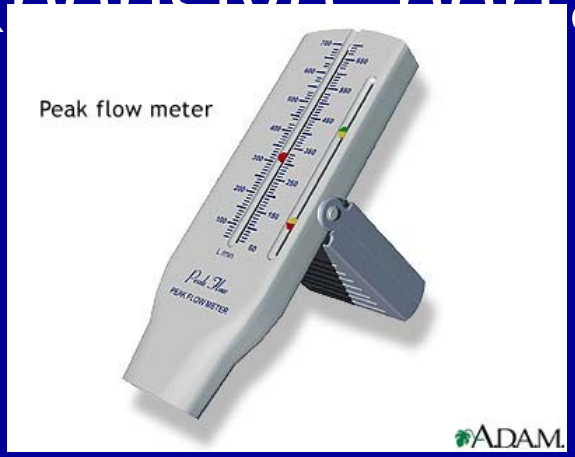
- Remove the cap
- Shake the inhaler and insert in the back of the spacer
- Place the mouthpiece in the mouth
- Press the canister once to release a dose of the drug
- Take a slow, deep breath in
  - A whistling sound indicates that inhalation is too rapid

How To Use an Aerochamber®

- Hold the breath for ~ 10 seconds, then breathe out through the mouthpiece
- Breathe in again but do not press the canister
- Remove the mouthpiece from the mouth and breath out
- Wait a few seconds and repeat f second dose

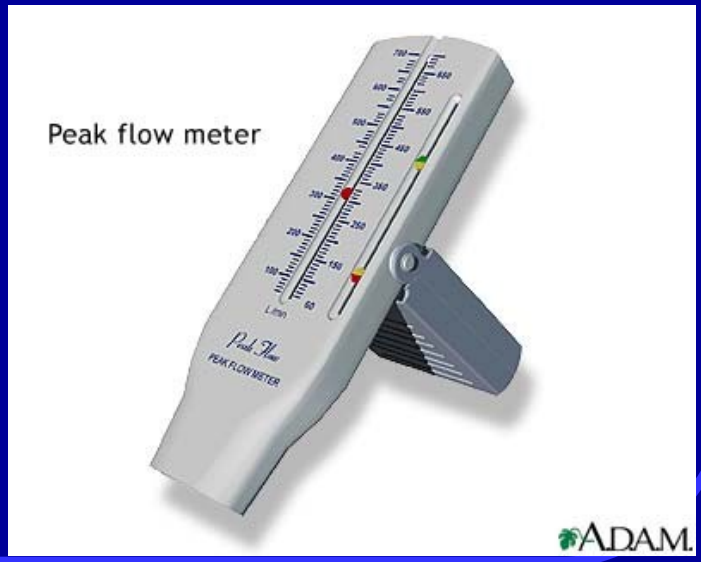
Peak Flow Meters

- Purpose
  - Used to determine patients' "personal best" to develop an asthma action plan
- Inexpensive, portable device



How To Use a Peak Flow Meter

- Move the marker to the bottom of the numbered scale
- Stand up straight
- Take a deep breath and fill lungs completely
- Place mouthpiece in your mouth and seal lips around it
- Blow out as hard and fast as possible in a single blow
  - The first burst of air is the most important. Blowing for a longer period of time doesn't make a difference



How To Use a Peak Flow Meter

- Record the number you get
  - Do not record if you cough or make a mistake
- Move the marker back to the bottom and repeat these steps two more times
  - The *highest* of the three numbers is your peak flow number
  - Record it in your log chart

Asthma Action Plan

- Green Zone: Doing Well
  - 80-100% of personal best peak flow
  - Take long term control medications
- Yellow Zone: Asthma is Getting Worse
  - 50-80% of personal best peak flow
  - Add quick-relief meds and continue green zone meds
- Red Zone: Medical Alert
  - <50% of personal best peak flo
  - Follow specific instructions from provider

Other Devices

- Foradil® Aerolizer
  - Formoterol, long acting beta$_2$ agoni
  - Puncture capsule then inhale dose

- Maxair® Autohaler
  - Pirbuterol, short acting beta$_2$ agonis
  - Breath-actuated MDI

- Spiriva® HandiHaler
  - Tiotropium, long acting, once daily anticholinergic for COPD
  - Puncture capsule then inhale dose

Delivery Devices: Key Points

- Do not float any MDI
- Multidose devices
- Replacement of CFC with HFA* (non-CFC) propellants; discuss lack of “feeling” dose
- Technique should be reviewed and reinforced
  at **every** visit for **all** devices

*HFA = hydrofluoroalkane

Questions?